

REMARKS

1. Claims Amendments

The claims generally have been amended to correct minor typographical errors, to clarify the relation between the elements and in particular that there is no heat treatment applied to the product in the invention, and to provide the proper antecedent basis for elements. The dependant claims previously indicated as allowable have been amended to independent form including all of the limitations of the base claims and any intervening claims and stand ready for allowance.

No new matter has been added by any of these amendments.

2. 35 USC 112

The claims have been amended to recite "without heat treatment" or "with out any heat" treatment rather than the without intermediate heat treatment or in the absence of heat treatment. It is the intent of this amendment to clarify that the bonding process is a cold-roll process and the layers are not heated at any phase of the bonding either to promote diffusion or to resort the inter-metallic compounds at the interfaces.

As to claims 31-33 specifically, the claims are intended to claim the final product.

3. 35 USC 102

The rejection of claims 1,4, 5, 11-13, 16 and 34 as anticipated by Hirano 5028495 is respectfully traversed.

The rejection of claims 1,4, 5, 11-13, 16 and 34 as anticipated by Jha 5553770 is respectfully traversed.

The rejection of claims 1,4, 5, 11-13, 16 and 34 as anticipated by Mennucci 5761799 is respectfully traversed.

The rejection of claims 1,4, 5, 11-13, 16 and 34 as anticipated by Galasso 4034454 is respectfully traversed.

The rejection of claims 1-18,34-36, 50, and 53-55 as anticipated by Hirano JP 4-006173 is respectfully traversed.

The rejection of claim 31 as being anticipated by Ryan 4,725,509 is respectfully traversed.

As applicant has previously stated, as the applied prior art shows and as the examiner has previously acknowledged, the commonly accepted process is to roll bond the metals (typically no more than no more that 65% thickness reduction) with the strip thereafter being "heat treated" to resort the metal to be further cold rolled. These Ti or Zr alloys usually lack sufficient ductility to allow cold rolling more the 60 to 70%. In a multi-layer clad metal, the "heat treatment" (annealing) temperatures required for Ti or Zr will cause sufficient inter diffusion (mixing) of Ti or Zr to Cu and/or Ni to form layers of intermetallic compounds on the interfaces. These compounds are very hard (brittle) and will not be softened by any "heat treatment" process. The presence of these compounds will render the material unable to be further cold rolled. Furthermore, the presence of these compounds will cause changes of melting of the foil for a successful brazing operation to be carried out. The examiner's rejections appear to be ignoring the above metallurgical facts or to be asking applicant to supply proof of the above facts, by stating that there is no difference in the products claimed by applicant when formed in accordance with the product by process claims. It is not understood why the examiner chooses to ignore the accepted physical properties of heat treated brazes and foils of the prior art.

However, alloy of Ni and Cu can be cold rolled extensively (such as >95%) without strip breakage during rolling. In the claimed invention appears that the layers of Cu and Ni alloys clad to Ti or Zr prevent the breakage and allow the extensive cold rolling of materials without "heat treatment". The "without heat treatment" claim is a counter intuitive approach in metal cold rolling art. This is in particular true in the well established field of cold rolling of Ti or Zr. As the learned examiner is aware, The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.)

Hirano 495 teaches "The clad sheet underwent annealing at 850.degree. C. for 2 minutes and rolling at a reduction ratio of 50%. The clad sheet further underwent annealing and rolling repeatedly." It is respectfully submitted that the repeated annealing creates a different structure than cold rolling with out any heat treatment. As noted in the specification and applicants previous arguments, and by the examiner in response thereto, heat treating including annealing of the rolled strips creates brittleness and precludes further rolling. In the present invention the lamination of the core Ti - Zr with the outer layers with out heat treatment allows further processing and overcomes the embrittlement feature.

Jha 770 teaches "The annealed composite material is then formed in the desired shape for assembly into the finished heat exchanger." In each example Jha teaches heat treatment.

Menucci does not teach the claimed invention but rather a titanium anode with platinum stripes. There is nothing in Menucci to indicate that the claimed invention could be produced following the Menucci teachings or would be suitable for use as an anode. As noted Menucci produces a different product, to wit an anode, by a different process, namely etching of layers away from a cold rolled strip.

Galasso teaches creating a Ti foil that is bonded to depressant layers by heating "The assembly, with the surfaces held together by application of pressure preferably in the range of 2 to 100 psi, is heated to the bonding temperature to melt the interlayer and fill the gaps between the surfaces. The bonding temperatures employed in accordance with the invention are above approximately 1550.degree. F" The structures called for by Galasso are not consonant with the claimed invention.

Ryan teaches a Ti Cu Ni foil which is ostensibly formed by rolling, or deposition or plating of the layers, however, Ryan mentions "rolling" as one potential way to make his braze, in a single sentence, but does address at all the physical characteristics addressed by the instant product and claims which yield a different structure due to the way the bonds are formed without heat treating. Thus, Ryan cannot be said to anticipate.

In view of (1) Applicant's previous arguments submitted in response to the June 27, 2007 office action, and (2) the new amendments making it clear that Applicant is claiming the product formed by roll bonding without any heat treatment, applicant respectfully requests that the examiner withdraw the rejections under 35 USC 102.


3. 103 rejections.

Claims 31 – 33 previously indicated as allowable have now been rejected under 35 USC 103. As noted above these claims are rejected over Ryan which fails to do anything more than state without explanation or exposition that the braze disclosed in Ryan could possibly be made by rolling. Indeed Ryan specifically states only that “Other potential methods for producing the filler metal include rolling titanium, copper and nickel sheets to produce a composite foil,...” thus, Ryan did not even address the problems solved by the present invention and cannot suggest or make the present invention obvious.

CONCLUSION

Applicants submit that the patent application is in condition for allowance and respectfully request such action. If the examiner has any questions that can be answered by telephone, please contact the patent attorney of record at the address and telephone number listed below.

Respectfully submitted,
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